

Name: _____ Date: _____ Math: _____

Unit Rates and Percentages Study Guide

1. There are 25 students in a class and 10 of them are wearing blue shirts.

a. What percentage of the students are wearing blue shirts?

40% are wearing blue shirts

Students	percentage
25	100
5	20 $\div 5$
10	40 $\div 2$
15	60 $\div 3$

- b. If 60% of students are wearing a gray shirt, how many students are wearing a gray shirt?

15 students are wearing a gray shirt

2. Determine how long each trip would take.

a. Jog 6 miles per hour to a field which is 3 miles away.

The trip will take $\frac{1}{2}$ hour.

miles	hours
6	1
3	$\frac{1}{2}$

- b. Take a train going 60 miles per hour from Washington DC to New York City, which is 120 miles away.

The trip will take 2 hours.

miles	hours
60	1
120	2

- c. Drive 40 miles per hour from Stevensville to Ocean City, which are 80 miles apart.

The trip will take 2 hours.

miles	hours
40	1
80	2

3. Izzy's family is taking a road trip. They are 60% of the way to their destination and have traveled 42 miles. How far is the trip?

The trip is 70 miles
total

miles	percentage
42	60
$\div 6 \rightarrow 7$	$10 \leftarrow \div 6$
70	100 $\leftarrow \cdot 10$

4. Kathya reads 6 pages of her book in 7 minutes. Hint: Write your answers as fractions.

- a. How many minutes per page is that?

$\frac{7}{6}$ or $1\frac{1}{6}$ minute per page

- b. How many pages per minute is that?

$\frac{6}{7}$ pages per minute

pages	minutes
6	7
$\div 6 \rightarrow 1$	$\frac{7}{6} \leftarrow \div 6$
$\frac{6}{7}$	$1 \leftarrow \div 7$
$\cdot 23 \rightarrow 23$	$26\frac{5}{6} \leftarrow \cdot 23$

- c. If Kathya reads 23 pages at the same rate, how long will it take her?

It will take her
 $26\frac{5}{6}$ minutes to read
23 pages

$$23 \cdot \frac{7}{6} = \frac{161}{6} =$$

$$\begin{array}{r} 23 \\ \times 7 \\ \hline 161 \end{array}$$

$$\begin{array}{r} 26\frac{5}{6} \\ 6 \overline{)161} \\ \underline{-12} \\ 41 \\ \underline{-36} \\ 5 \end{array}$$

5. Choose the greater of each pair:

- a. 8.2 kilograms or 13 pounds (Note: 1 pound is about 0.45 kilograms)

8.2 kilograms is greater
than 13 pounds because 13 pounds
equals 5.85 kilograms

$$\begin{array}{r} 13 \\ \times 0.45 \\ \hline 65 \\ 520 \\ \hline 5.85 \end{array}$$

pounds	kg
1	0.45
$\cdot 13 \rightarrow 13$	$5.85 \leftarrow \cdot 13$

- b. 13 yards or 12 meters (Note: 1 yard is about 0.9 meters)

12 meters is greater because
13 yards equals 11.7 meters

$$\begin{array}{r} 13 \\ \times 0.9 \\ \hline 117 \\ \hline 11.7 \end{array}$$

yards	meters
1	0.9
$\cdot 13 \rightarrow 13$	$11.7 \leftarrow \cdot 13$

- c. 24,562 ounces or 1,684 pounds (Note: 1 pound = 16 ounces)

1,684 pounds is greater
because it equals
26,944 ounces

$$\begin{array}{r} 1684 \\ \times 16 \\ \hline 10104 \\ 16840 \\ \hline 26944 \end{array}$$

pounds	ounces
1	16
$\cdot 1684 \rightarrow 1,684$	$26,944 \leftarrow \cdot 1684$

6. Mrs. Moore is biking to meet Mr. Moore after work. They are 15 miles apart when they start moving toward each other on the Metropolitan Branch Trail. She bikes at a constant speed of 4 miles per hour, while he bikes faster (he has a faster bike 😊) at a constant speed of 6 miles per hour. How long does it take until Mrs. and Mr. Moore meet on the trail?

It will take them
 $1\frac{1}{2}$ hours to meet
 on the trail.

total miles	hour
$4+6=10$	1
5 $\leftarrow \div 2$	$\frac{1}{2} \leftarrow \div 2$
$.3 \leftarrow 15$	$\frac{3}{2} \leftarrow .3$

7. Metro is conducting research on its trains and wants to know the distance a train travels over certain intervals.

time (hours)	distance (miles)
0.5	17.5
1	35
1.5	52.5

Assuming that the train travels at a constant speed, what is its speed?

The train's speed is 35 miles
 per hour.